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SYLLABUS
OF
LECTURES ON NATURAL HISTORY.

The Course of Lectures on Natural History embraces General and Particular Details and Views in Meteorology, Hydrology, Mineralogy, Geology, Botany, and Zoology. These subjects are discussed in the following order:—

GENERAL VIEW OF WHAT CONSTITUTES THE SCIENCE AND OBJECTS OF NATURAL HISTORY.

I. METEOROLOGY.

This branch of Natural History, which makes us acquainted with the various properties and relations of the Atmosphere, is treated as follows:—

GENERAL OBSERVATIONS ON THE ATMOSPHERE.

I. General Properties of the Atmosphere.

1. Pressure—Its effects on Animals, especially Man—On Vegetables—Also on Tides, Waves, Gaseous terrestrial Emanations, and Earthquakes—Its variations, as indicated by the Barometer—The Barometer, as connected with Atmospheric changes—Theory of the Barometer; 2. Figure; 3. Height; 4. Temperature—*a.* Decrease of Temperature with height above the level of the Sea—*b.* Rate of Diminution of Temperature with height, and explanation of this diminution of Temperature—*c.* Decrease of Temperature from the Equator to the Poles—*d.* Effect of the Sea on the Temperature of the Atmosphere—*e.* Effect of the Land in cooling or heating the currents of Air passing over it—*f.* Effect of Mountains on the Temperature of Countries—

g. Effect of Soil and its Products on the Temperature of the Atmosphere—*h*. Radiation of Heat—*j*. Mean Temperature—*k*. Isothermal, Isotheral, Isochimenal, and Isogeothermal Lines—*l*. Extremes of Natural Temperature—*m*. Mean Annual Temperature at the Equator—*n*. Temperature at the Poles of the Earth—*o*. Poles of Maximum Cold—*p*. Temperature of the Seasons.—*q* Temperature of the two Hemispheres—*r*. Local Temperatures—*s*. Range of the Thermometer—*t*. Prognostication of the Weather by the Thermometer—*u*. Effects of Heat and Cold on the Physical and Geographical Distribution of Organic Beings;—5. Colour; 6. Light; 7. Transparency; 8. Refraction and Twilight: 9. Temperature of Space, or of the Celestial Regions; 10. Transparency of Space; 11. Composition. *Illustrated by Drawings, Maps, and Plans.*

II. METEORS.

1. *Aqueous Meteors.*—1. Evaporation; 2. Dew; 3. Hoarfrost; 4. Aqueous Fog; 5. Dry Fog; 6. Clouds; 7. Rain; 8. Hail; 9. Sleet; 10. Snow; 11. Snow-line; 12. Glaciers—their Groovings, Moraines, &c., in Scotland, &c.; 13. Avalanche; 14. Iceberg. *Illustrated by Drawings, Maps, Plans, and Specimens.*

2. *Luminous Meteors.*—*1. Rainbow; 2. Halo; 3. Parhelion and Paraselene; 4. Corona; ** 5. Shadows; *** 6. Unusual Atmospheric Refractions, including Looming; Single, Double, and Triple Images; Fata Morgagna; Mirage; **** 7. Atmospherical Electricity; Lightning; Thunder; Electrical Musical Sounds; St Elmo's Fire, or Castor and Pollux; Electricity of Animals and Plants; ***** 8. Fireballs, and the Stones that fall from the heavens; 9. Falling or Shooting Stars; ***** 10. Aurora Borealis; ****** 11. Zodiacal Light; ******* Ignis fatuus, or Will-with-a-Wisp. *Illustrated by Drawings, Maps, Plans, and Specimens.*

III. WINDS.

a. Force; Velocity; Direction:—*b*. Trade Winds; Monsoon Winds; Sea and Land Breezes;. Etesian Winds—*c*. Whirlwind; Moving Columns of Sand in the Desert; Water-Spout; Hurricane; Typhoon.—*d*. Tornado; Squall; Pamperos; Helm Wind.—*e*. Khamsin; Simoom; Harmattan; Sirocco; Solano.—*f*. Variable Winds. Winds of Great Britain and Ireland. *Illustrated by Drawings and Maps.*

IV. SOUND.

1. Different kinds; 2. Propagation; 3. Intensity; 4. Velocity; 5. Transmission; 6. Reflection; 7. Echoes; 8. Physical and Moral Effects on Man.

V. PROGNOSTICS OF THE WEATHER.

From the Sun, Moon, Stars, Atmosphere, Ocean, Lakes, Springs, Animals, Plants, and Minerals.

VI. METEOROLOGICAL INSTRUMENTS.

1. Barometer; 2. Thermometer; 3. Hygrometer; 4. Actinometer; 5. Cyanometer; 6. Electrometer; 7. Rain-gauge; 8. Anemometer; 9. Vane; 10. Magnetic Needle; 11. Professor Leslie's Meteorological Instruments.

VII. METEOROLOGICAL OBSERVATORIES AND REGISTERS.

VIII. CLIMATE.

Physical Seasons. Climate in general; its different kinds, according to situation and latitude; its effects on animals, especially the human species; illustrated by a reference to the distribution of man, and the characters of diseases; its effects on plants. *Illustrated by Maps.*

† Climate of Great Britain.

†† The Subterranean and Submarine Atmospheres of authors noticed.

††† Ancient or Geological Meteorology.

II. HYDROLOGY.

This branch of Natural History, which makes us acquainted with the various properties and relations of the Waters of the Globe, is treated in the following order:—

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I. Observations on the importance of Water in the economy of Nature, and to Mankind. II. Detailed descriptions and histories of Water in its various states, conditions, and situations, in the following order:—

A. OCEAN.

1. Level; 2. Colour; 3. Transparency; 4. Temperature; 5. Depth—Air in Sea Water at different depths—Visibility of Shoals; 6. Saltness; 7. Sea-ice; 8. Luminousness; 9. Motions.—*a.* Waves, and Stilling the Sea by means of Oil;—*b.* Currents—Equinoctial or Great Western Current—Gulf Stream, and other Principal Currents connected with the great Equinoc-

tial Current—Sargasso Sea; Upper and Under Currents, &c.; —*c.* Whirlpools;—*d.* Tides; their Phenomena and History; —*e.* Propagation of Sound in Water;—*f.* Vision under Water; —*g.* Oceanic Scenery and Climate. * Sea sickness. *Illustrated by Drawings, Maps, and Plans.*

B. SPRINGS.

1. Different kinds of Springs, viz. Temporary or Periodical, Perennial, Intermittent, Tidal; 2. Magnitude; 3. Temperature, including cold and thermal springs; 4. Colour; 5. Composition; Common Springs, Mineral Springs, and their Medicinal properties; 6. Rocks formed by Springs during different periods of the earth's formation; 7. Estimate of the annual quantity of mineral matter brought from the interior of the earth by modern springs, and deposited by them on its surface; 8. Influence of Earthquakes on Springs; 9. Geognostical situation; 10. Geographical distribution; 11. Theory of Springs; 12. Uses to mankind and in the economy of Nature. *Illustrated by Drawings, Maps, Plans, and Specimens.*

C. LAKES.

1. Different kinds of Lakes; 2. Situation; 3. Distribution; 4. Number; 5. Magnitude; 6. Depth; 7. Temperature; 8. Colour; 9. Occultation; 10. Agitations; 11. Floating Islands in Lakes; 12. Lake Noises; 13. Water of Lakes—According to which they are divided into Fresh-water, Salt-water, Alkaline Lakes, &c.; 14. Formation of Lakes; 15. Emptying of Lakes by natural means, and the theory of Lake Terraces; 16. Lake Scenery and Climate. *Illustrated by Drawings, Maps, and Sections.*

D. RIVERS.

1. Different Classes; 2. River Districts; 3. Direction; 4. Fall; 5. Velocity; 6. Eddies, Freshes, Bore; 7. Retardation; 8. Drying up or Desiccation; 9. Occultation; 10. Colour; 11. Temperature; 12. Effect of the clearing of land on the running water of a country; 13. River Ice; 14. Beds of Rivers and the materials they carry along with them; 15. Quantity of Sediment; 16. Rise of the Bottom; 17. Inundations; 18. Magnitude; 19. Deltas; Bars at the mouths of Rivers; 20. Cascades; 21. Water, its varieties and composition; 22. River Scenery and Climate. *Illustrated by Drawings, Maps, Plans, and Specimens.*

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† Ancient or Geological Hydrology.

III. MINERALOGY.

This branch of Natural History, which makes us acquainted with the various natural and economical relations of Simple Minerals, is treated in the following manner:—

1. Explanation of the Language of Mineralogy.

2. Account of Systems of Mineralogy. A System founded partly on external and partly on chemical characters adopted. In this System there are three classes, viz.—Class 1. Gases, Waters, Acids, and Salts or Saline Minerals; Class 2. Haloidal Minerals, ex. *Limestone*, *Heavy Spar*, *Sparry Iron*; Terrigenous Minerals, ex. *Felspar*, *Hornblende*, *Quartz*; and Metalliferous Minerals, ex. *Native Gold*, *Iron Pyrites*, *Cinnabar*; Class 3. Inflammable Minerals, ex. *Coal*.

3. Descriptions of Simple Minerals.

4. Uses of Simple Minerals in the Arts, Medicine, Agriculture, and in the economy of Nature.

5. Physical and Geographical Distribution of simple Minerals.

This Department illustrated by numerous characteristic Specimens, Maps, &c.

IV. GEOLOGY.

This branch of Natural History treats of the structure and composition of the solid mass of the Earth, and its mode of formation. The general cosmical properties of the Globe, its connexion with the Planetary System and that of the Universe, are also considered. The following is the order of the Lectures:—

1. Cosmical properties of the Earth.—1. Figure; 2. Density; 3. Magnitude; 4. Temperature; 5. Electricity; 6. Luminousness; 7. Magnetism.

2. Physiognomy of the Earth, including descriptions of Continents, Islands, Peninsulas, High Lands and Low Lands; Plains, including Landes, Steppes, Deserts, Llanos, Selvas, and Oases; Mountains, including Single Mountains, Chains of Mountains, Groups of Chains of Mountains, Chains of Groups of Mountains, Hilly Land; Valleys; Caves, Caverns; inequalities of the Submarine land.

3. Structures observable in the solid mass of the Earth. Structure in general. Structure of Mountain-Rocks, Mountain Masses, Mountain Groups, and Crust of the Earth. Uses of the Compass and Quadrant explained.

4. Known thickness of the Crust of the Earth.

5. Contemporaneous and non-contemporaneous formation of Rocks explained.

6. Materials of which the solid mass of the Earth is composed.

7. Account of Quartz, Felspar, Mica, Hornblende, and Limestone, the minerals of which the solid mass of the Earth is chiefly composed.

8. Account of the different classes of Rocks, viz. Primitive, Transition, Secondary, Tertiary, Alluvial, and Modern Volcanic.

9. Mineral Repositories, as Metalliferous Beds, Imbedded Masses, Veins, &c., considered.

10. Phenomena, Effects, and Theory of Volcanoes and Earthquakes.

11. Fossil Organic Remains, their systematic Arrangement, and Description. Geognostical Distribution in the Crust of the Earth, and that distribution as connected with the State of the Earth during its formation.

12. Formation of Mountains, Valleys, Plains, and Caves.

13. Deluges, considered.

14. Theories of the Earth.

15. Relation of Tradition to Palætiology.

16. Description and Arrangement of Soils; or those loose superficial matters that cover the solid strata, and on which plants grow, and many animals live.

17. The Connexion of Geology with Agriculture, Planting, and the Characters and Distribution of Diseases.

18. Account of the Planetary System.

19. Comparison of the Form, Magnitude, Weight, Surface, Light, and Atmosphere, of the Sun, Moon, and other members of our Planetary System, with those of the Earth.

20. Fixed Stars, as seen by the naked eye and the telescope; and on the various groupings and arrangement of these, constituting the Grand System of the Universe.

* *a.* Geognostical Structure of Scotland, England, and Ireland. *b.* Modes employed in searching for useful minerals. *c.* Mode of conducting Mineral Surveys, of constructing Geognostical Sections and Maps, and of modelling Mountains, Hills, and Plains.

This Department illustrated by numerous Specimens, Maps, Drawings, Plans, Sections, and Models.

V. BOTANY.

In the view of Botany given in these Lectures the attention is directed to those general details and views which are connected with, and illustrative of, the other departments of Natural History. It is treated in the following order :

1. General account of the Structure, Physiology, and Systematic Arrangement of Plants.

2. Physical and Geographical Distribution of Plants ; *a.* History of the Geography of Plants ; *b.* Humboldt's investigations in regard to the distribution of Families of Plants ; *c.* Changes in Vegetation, according to height above the level of the sea, and distance from the Equator, as exemplified in the Floras of Scandinavia, Iceland, Great Britain, Alps, Pyrenees, Sicily, Caucasus, Himalaya, Andes, Madeira, Canary Isles, Isle of Ascension, &c. ; *d.* Phytogeographic division of the surface of the Earth, into regions ; *e.* The distribution of those Plants employed as food or otherwise by man.

3. Distribution of Fossil Plants in Transition, Secondary, Tertiary, and Alluvial Formations.

4. Comparison of the present Distribution of Plants with that exhibited by Fossil Plants.

5. Changes in the climate of the Earth, as disclosed by the Physical and Geographical Distribution of Living and Fossil Plants.

6. Natural History of Coal illustrated by the phenomena exhibited by Fossil Plants.

7. Connexion of the Geography of Plants with the Political and Moral History of Man.

8. Influence of the Phenomena of Vegetation on the Taste and Imagination of Nations.

This Department illustrated by Maps, Plans, Drawings, and Specimens.

VI. ZOOLOGY.

This branch of Natural History, which makes us acquainted with the various Properties and Relations of Animals, is considered in the following order.

As the human species stands apart from all the other animals in the zoological system, we begin with the Natural History of

MAN.

1. General view of the Structure of Man.
2. Physiological relations of Man.
3. Man traced through his first period of existence, or from the monadal state, to the period of his birth.
4. Characters by which Man is distinguished from the lower animals.
5. Division into Male and Female, the general and particular characters of each.
6. There is but one species of Man.
7. The species Man is divided into Races, Subraces, Kinds, Families, and Varieties. These defined and described.
8. Man considered as to Colour, Stature, Size, Strength, Longevity.
9. Man traced from the period of his birth, through the different stages of his second existence, until his career terminates in this planet.
10. Geographical Distribution of Man.
11. Physical Distribution of Man.
12. Population of the Globe.
13. Age of Man.—1. Historically considered.
    2. Geologically considered.

This Department illustrated by Specimens, Maps, Drawings, and Plans.

ANIMAL KINGDOM.

Divided into Sub-Kingdoms.

FIRST SUB-KINGDOM.

VERTEBRATA or ENCEPHALATA (*Osteozoa, Myelencephala.*)

Characters of this Sub-Kingdom enumerated.

CLASS I. MAMMALIA.

Including Quadrupeds and Cetaceous Animals.

1. Cutaneous System; 2. Osseous System; 3. Muscular System; 4. Organs of Locomotion; 5. Circulating System; 6. Respiratory System; 7. Digestive System; 8. Urinary System; 9. Generative System; 10. Nervous System; 11. Organs of the Senses; 12. Generation; 13. Hybrids; 14. Hybernation; 15. Longevity; 16. Number; 17. Migrations; 18. Uses in the economy of Nature; 19. Geographical and Physical Distribution; 20. Domestication; 21. Dietetical Uses; 22. Diseases. *This general view illustrated by exhibition of Specimens.*

* Characters used in the Description, Arrangement, and Determination of the Species.

** Account of the principal Genera and Species. *Exhibition of Specimens.*

*** Fossil Mammalia. *Exhibition of Specimens.*

CLASS II. AVES.

1. Cutaneous System 2. Osseous System; 3. Muscular System; 4. Organs of Locomotion; 5. Circulating System; 6. Respiratory System; 7. Digestive System; 8. Urinary System; 9. Generative System; 10. Nervous System; 11. Organs of the Senses; 12. Generation; 13. Hybrids; 14. Nidification; 15. Pairing; 16. Migration; 17. Longevity; 18. Number; 19. Geographical and Physical Distribution; 20. Uses in the economy of Nature; 21. Domestication; 22. Dietetical Uses; 23. Diseases. *This general view illustrated by exhibition of Specimens.*

* Characters used in the Description, Arrangement, and Determination of the Species.

** Account of the Orders, Genera, and Species, as far as is necessary for the Student. *Illustrated by exhibition of Specimens.*

*** Fossil Birds. *Exhibition of Specimens.*

CLASS III. REPTILIA.

1. Cutaneous System; 2. Osseous System; 3. Muscular System; 4. Organs of Locomotion; 5. Circulating System; 6. Respiratory System; 7. Digestive System; 8. Urinary System; 9. Generative System; 10. Nervous System; 11. Organs of the Senses; 12. Generation; 13. Hybernation; 14. Longevity; 15. Number; 16. Geographical and Physical Distribution; 17. Dietetical Uses; 18. Uses in the economy of Nature. *Exhibition of Specimens.*

Characters used in the Description, Arrangement, and Determination of the Species.

** Principal Genera and Species. *Exhibition of Specimens.*

*** Fossil Reptilia. *Exhibition of Specimens.*

CLASS IV. AMPHIBIA.

1. Cutaneous System; 2. Osseous System; 3. Muscular System; 4. Organs of Locomotion; 5. Circulating System; 6. Respiratory System; 7. Digestive System; 8. Urinary System; 9. Generative System; 10. Nervous System; 11. Organs of the Senses; 12. Generation; 13. Hybernation; 14. Geographical and Physical Distribution; 15. Uses in the economy of Nature. *Exhibition of Specimens.*

* Characters used in the Description, Arrangement, and Determination of the Species.

** Principal Genera and Species. *Exhibition of Specimens.*

*** Fossil Amphibia. *Exhibition of Specimens.*

CLASS V. PISCES.

1. Cutaneous System; 2. Osseous System; 3. Muscular System; 4. Organs of Locomotion; 5. Circulating System; 6. Respiratory System; 7. Digestive System; 8. Urinary System; 9. Generative System; 10. Nervous System; 11. Organs of the Senses; 12. Electrical Organs; 13. Generation; 14. Hybrids; 15. Longevity; 16. Number; 17. Migration; 18. Physical and Geographical Distribution: 19. Uses in the economy of Nature; 20. Domestication; 21. Dietetical Uses; 22. Diseases. *Exhibition of Specimens.*

* Characters used in the Description, Arrangement, and Determination of the Species.

** Principal Genera and Species. *Exhibition of Specimens.*

*** Fossil Fishes, according to the system of Agassiz. *Exhibition of Specimens.*

SECOND SUB-KINGDOM.

MOLLUSCA or CYCLOGANGLIATA (*Heterogangliata*).

1. Cutaneous System, with an account of the mode of formation of Shells, &c.; 2. Muscular System; 3. Organs of Locomotion; 4. Circulating System; 5. Respiratory System; 6. Digestive System; 7. Generative System; 8. Nervous System; 9. Organs of the Senses. *Exhibition of Specimens.*

CLASS I. CEPHALOPODA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

Orders.—1. Dibranchiata, ex. *Sepia;* 2. Tetrabranchiata, ex. *Nautilus.* *Exhibition of Specimens.*

* Fossil Cephalopoda. *Exhibition of Specimens.*

CLASS II. GASTEROPODA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution; 4. Dietetical uses. *Exhibition of Specimens.*

Orders.—1. Pulmonea, ex. *Limax, Helix, Planorbis;* 2. Nudibranchiata, ex. *Doris, Tritonia, Glaucus;* 3. Inferobranchiata, ex. *Phyllidia;* 4. Tectibranchiata, ex. *Pleurobranchus, Aplysia;* 5. Heteropoda, ex. *Carinaria, Firola;* 6. Pectinibranchiata, ex. *Turbo, Calyptræa, Conus;* 7. Tubulibranchiata, ex. *Vermetus;* 8. Scutibranchiata, ex. *Haliotis, Fissurella;* 9. Cyclobranchiata, ex. *Patella, Chiton.* *Exhibition of Specimens.*

* Fossil Gasteropoda. *Exhibition of Specimens.*

CLASS III. PTEROPODA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

Orders.—1. Gymnosomata, ex. *Clio;* 2. Thecosomata, ex. *Cleodora.* *Exhibition of Specimens.*

CLASS IV. ACEPHALA, or CONCHIFERA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution; 4. Dietetical uses. *Exhibition of Specimens.*

Orders.—1. Acephala Testacea, ex. *Ostrea, Anomia, Spondylus;* 2. Acephala nuda (*Tunicata of Lamarck*), ex. *Ascidia, Pyrosoma, Botryllus.* *Exhibition of Specimens.*

CLASS V. BRACHIOPODA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

GENERA.—1. Lingula; 2. Terebratula; 3. Orbicula. *Illustrated by Specimens.*

CLASS VI. CIRRHIPEDA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

* Orders.—1. Anatifida, ex. *Pentalasmis.* 2. Balanida, ex. *Balanus.* *Exhibition of Specimens.*

** Fossil Cirrhipeda. *Exhibition of Specimens.*

THIRD SUB-KINGDOM.

ARTICULATA (*Homogangliata*).

1. Cutaneous System; 2. Muscular System; 3. Organs of Locomotion; 4. Circulating System; 5. Respiratory System; 6. Digestive System; 7. Generative System; 8. Nervous System; 9. Organs of the Senses, &c. *Exhibition of Specimens.*

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CLASS I. CRUSTACEA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution; Dietetical Uses. *Exhibition of Specimens.*

* Orders.—1. Decapoda, ex. *Carcinus;* 2. Stomapoda, ex. *Squilla;* 3. Amphipoda, ex. *Orchestia, Talitrus;* 4. Læmodipoda, ex. *Cyamus;* 5. Isopoda, ex. *Oniscus;* 6. Branchiopoda, ex. *Monoculus;* 7. Pæcilopoda, ex. *Limulus.* *Exhibition of Specimens.*

** Fossil Crustacea. *Exhibition of Specimens.*

CLASS II. ARACHNIDA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

* Orders.—1. Pulmonata, ex. *Mygale, Aranea, Scorpio;* 2. Tracheata, ex. *Chelifer, Acarus.* *Exhibition of Specimens.*

** Fossil Arachnida. *Exhibition of Specimens.*

CLASS III. INSECTA.

1. Cutaneous System; 2. Muscular System; 3. Organs of Locomotion; 4. Circulating System; 5. Respiratory System; 6. Digestive System; 7. Generative System; 8. Nervous System; 9. Organs of the Senses; 10. Number; 11. Longevity; 12. States; 13. Societies; 14. Noises; 15. Luminosity; 16. Hybernation; 17. Instincts; 18. Geographical and Physical Distribution; 19. Uses in the economy of Nature; 20. Domestication; 21. Dietetical Uses; 22. Diseases; 23. Diseases in Man and other Animals, also in plants, occasioned by insects. *Exhibition of Specimens.*

* Orders.—1. Coleoptera; 2. Dermaptera; 3. Orthoptera;

4. Hemiptera; 5. Neuroptera; 6. Hymenoptera; 7. Lepidoptera; 8. Rhipiptera; 9. Diptera; 10. Syphonaptera; 11. Parasita; 12. Thysanoura. *Exhibition of Specimens.*

** Fossil Insecta. *Exhibition of Specimens.*

CLASS IV. MYRIAPODA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

* Orders.—1. Chilopoda, ex. *Scclopendra;* 2. Chilognatha, ex. *Julus.* *Exhibition of Specimens.*

** Fossil Myriapoda. *Exhibition of Specimens.*

* *

CLASS V. ANNELIDA, *Red-blooded Worms.*

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution; 4. Uses. *Exhibition of Specimens.*

* Orders.—1. Tubicolæ, ex. *Serpula, Terebella, Dentalium;* 2. Dorsibranchia, ex. *Arenicola, Nereis, Halithea;* 3. Abranchia, ex. *Lumbricus, Hirudo, Gordius.* *Exhibition of Specimens.*

** Fossil Annelida. *Exhibition of Specimens.*

FOURTH SUB-KINGDOM.

RADIATA.

1. Cutaneous System; 2. Muscular System; 3. Organs of Locomotion; 4. Circulating System; 5. Respiratory System; 6. Digestive System; 7. Generative System; 8. Nervous System; 9. Organs of the Senses. *Exhibition of Specimens.*

Nerves in the higher classes, cycloneurous; in the lower classes, either very indistinct or not visible.

CLASS I. ECHINODERMA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution; 4. Uses. *Exhibition of Specimens.*

* Orders.—1. Holothurida; 2. Apoda, ex. *Sipunculus;* 3. Echinida; 4. Asterida; 5. Crinoida. *Exhibition of Specimens.*

CLASS II. ACALEPHA (*Medusaria*).

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

* Orders.—1. Palliograda, ex. *Rhizostoma, Cyanea, Medusa;* 2. Physograda, ex. *Physalia;* 3. Ciliograda, ex. *Beroe.* *Exhibition of Specimens.*

CLASS III. POLYPIFERA.

Form and Structure; Functions; Distribution. *Exhibition of Specimens.*

Order 1. Bryozoa, ex. 1. *Flustra;* 2. *Bowerbankia;* 3. *Cristatella.* 2. Anthozoa, * *Gorgonia, Pennatula;* ** *Tubipora;* *** *Pavonia;* **** *Alcyonium, Actinia.* 3. Hydrozoa, ex. 1. *Hydra;* 2. *Sertularia;* 3. *Campanularia;* 4. *Tubularia. Exhibition of Specimens.*

CLASS IV. ENTOZOA, or SUCTORIA, *White-blooded Worms.*

1. Form and Structure; 2. Functions; 3. Physical Distribution; 4. Connection with Diseases. *Exhibition of Specimens.*

Orders.—1. Cælelmintha (*Owen*) Vers intestinaux cavitaires (*Cuvier*), ex. *Ascaris, Linguatula;* 2. Sterelmintha (*Owen*) Vers intestinaux parenchymateux (*Cuvier*), ex. *Distoma, Trichina. Exhibition of Specimens.*

CLASS V. ROTIFERA.

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution. *Exhibition of Specimens.*

Orders.—1. Nuda; 2. Loricata.

CLASS VI. POLYGASTRICA *(Animalia Infusoria, Auct.)*

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution; 4. Uses. *Exhibition of Specimens.*

* Orders.—1. Diacæla, ex. *Enchelys, Leucophrys;* 2. Cyclocæla, ex. *Verticella;* 3. Anentera, ex. *Monas. Exhibition of Specimens.*

CLASS VII. PORIPHERA (*Amorphozoa*).

1. Form and Structure; 2. Functions; 3. Physical and Geographical Distribution; 4. Uses. *Exhibition of Specimens.*

* Orders.—1. Keratosa, *with corneous spiculæ;* 2. Leuconida, *with calcareous spiculæ;* 3. Halinida, *with siliceous spiculæ. Exhibition of Specimens.*

** Fossil Poriphera. *Exhibition of Specimens.*

CONCLUSION.

1. Instructions and Demonstrations as to the mode of Collecting, Preserving, Transporting, and Arranging objects of Natural History; 2. Collecting objects of Natural History recommended; 3. Advantages of Travelling; 4. Books in different branches of Natural History recommended; 5. Plan for future Study in Natural History pointed out and explained.